DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
NAVAL AIR SYSTEMS COMMAND HEADQUARTERS
WASHINGTON, DC 20361 -0001

IN REPLY REFER TO
NAVAIRINST 3710.9B
AIR-5313
3 Mar 87

NAVAIR INSTRUCTION 3710.9B

From: Commander, Naval Air Systems Command

Subj: ANTHROPOMETRIC ACCOMMODATION IN NAVAL AIRCRAFT

Ref: (a) OPNAVINST 3710.36A
(b) Manual of the Medical Department, U.S. Navy (NOTAL)
(c) BUMEDINST 3710.1
(d) MIL-STD-1333A (NOTAL)
(e) MIL-S-18471G (AS) (NOTAL)
(f) NAVAIRINST 4130.1B (NOTAL)
(g) CNATRAINST 13520.1B

Encl: (1) Personal Anthropometric Codes
(2) Aircraft Anthropometric Restrictions

1. Purpose. To establish

a. policy and assign responsibilities for implementing reference (a) to ensure that the physical dimensions of flight crew personnel, fully-equipped, are accommodated by the dimensions and configurations of the aircraft crew stations to which they are assigned; and

b. responsibilities for the timely development of crew station geometric data on aircrew physical accommodation, and issuance of this information to those agencies responsible for assigning flight crew personnel.

2. Cancellation. This instruction supersedes NAVAIR Instruction 3710.9A of 17 January 1984. Since this is a major revision, changes are not indicated.

3. Scope. This instruction applies to all echelons and all weapons systems and equipment under the management of the Commander, Naval Air Systems Command.

4. Definitions

a. Accommodation and compatibility refer to whether or not restrictions are placed on the personnel allowed to fly in specific aircraft based on anthropometric measurements.

b. Potentially eligible aircrew are those flight crew personnel meeting the physical entrance requirements in reference (b). In some cases, civilian aircrew personnel are included also.

5. Background. Flight crew personal anthropometric data are collected, coded, and recorded by Naval Medical Command per reference (c). Personal anthropometric codes are identified in enclosure (1) of this instruction. Crew station geometry data are obtained for each Navy and Marine Corps aircraft. Aircrew stations in some aircraft do

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not physically accommodate all potentially eligible flight crew. The consequences of assigning a crewmember to an aircraft with which he/she is anthropometrically incompatible can be catastrophic. Some important considerations include helmet-to-canopy clearance, functional reach (leg and arm) for critical controls and external vision (as defined in references (d) and (e)). It is necessary to identify those aircraft which must have anthropometric restrictions placed on them, and the anthropometric dimensions associated with the restrictions.

6. Policy. New aircraft developed and procured for Navy and Marine Corps use will accommodate the anthropometric range of the aviator population specified by reference (d) or the aircraft Type/Detail specification. Accommodation of less than the full range will be justified through trade-off studies and cost-benefit analyses. Modifications to existing aircraft crew station geometry will not degrade existing accommodation unless sufficient justification is presented to and accepted by the Configuration Control Board (CCB) (reference (f)). The impact of proposed crew station designs and/or modifications on aircrew accommodation will be determined and, where anthropometric restrictions are justified, restrictions will be identified to those agencies responsible for assigning and training aircrew personnel. Known restrictions for Navy and Marine Corps aircraft are detailed in enclosure (2). Once established for particular flight stations, restrictions apply as well to civilian aircrew and aircraft pilots (e.g., flight instructors) assigned to support an aircraft program. Where fit check codes are indicated in enclosure (2) to verify accommodation, reference (g) fit check procedures will be used as guidance.

7. Responsibilities

a. Naval Air Systems Command Headquarters (NAVAIRHQ)

(1) The Deputy Commander for Program Support (AIR-01), Program Directors-AIR (PDA's), Support Aircraft and Weapon Systems Program Coordination Office (APC200), Deputy Assistant Commander for Navy Range and Field Activity Management (AIR-42) and Program Managers Air (PMA's) are responsible for ensuring that all eligible flight crew personnel are accommodated in the crew stations of the aircraft under their cognizance, and for justifying any deviation from full accommodation. For new aircraft (including prototypes), the level of accommodation of flight crew personnel will be documented and presented to the reviewing authority at each major program milestone, along with justification for less than full accommodation. Where restrictions are justified for new aircraft, cognizant organizations will ensure that contractor training support personnel are physically assignable. For exisiting aircraft, the CCB will be provided with a statement reflecting the impact of any engineering change proposal (ECP), rapid action minor engineering change (RAMEC), or other proposed change on aircrew accommodation. APC200 and PMA's via the appropriate Systems Engineering Management Division (AIR-511) class desk will request information regarding the level of acommodation and/or extent of anthropometric restrictions at the following times:

(a) No later than 60 days prior to Milestones I, II, and III.

(b) During mockup inspections as required by NAVAIR Instruction 4355.8 (if applicable).

(c) No later than 30 days prior to clearing the aircraft for flight by Navy or Marine Corps flight crew and enlisted aircrew. APC200 and/or PMA's will provide direction and sufficient resources to make these assessments via appropriate channels.

(2) The Assistant Commander for Systems and Engineering (AIR-05); and AIR-511) will support paragraph 7a(1) above responsibilities and notify Crew Systems Division (AIR-531) of any planned ECP's, RAMEC's, or other changes which may impact crew station geometry or aircrew physical accommodation in aircraft under their cognizance, and will ensure that this instruction is referenced in all cognizant field activity agreements and design cognizance transfers.

(3) Advanced Development Program Officers (ADPO's) will, for prototype aircraft under their cognizance, support paragraph 7a(1) above responsibilities and provide direction and resources via AIR-531 to the Naval Air Test Center (NAVAIRTESTCEN) to measure the crew stations of each aircraft and provide results prior to clearing the aircraft for flight by Navy or Marine Corps aviators, Naval flight officers and enlisted aircrew, and civilian aircraft pilots.

(4) AIR-531 will

(a) investigate ECP's, RAMEC's, and other proposed changes suspected or predicted to impact crew station geometry or aircrew physical accommodation when reviewing CCB change requests per reference (f) or when requested by ADPO's, Weapon System Managers (WSM's), PMA's via AIR-511, or other cognizant offices. If a proposed change is determined to impact aircrew physical accommodation, AIR-531 will coordinate the provision of direction and resources via AIR-511 or other applicable offices to the appropriate field activity for the assessment of the magnitude of the impact in the affected aircraft. AIR-531 will provide the results of such an assessment to the cognizant class desk/PMA or APC200 prior to CCB action. If the assessment indicates enclosure (2) restrictions will be affected by the change and the change is approved by the CCB, AIR-531 will ensure NAVAIRTESTCEN (and/or other Navy activities participating in flight test of the change) is advised of the new anthropometric restrictions to be placed on the aircraft;

(b) assess the design of crew stations in new aircraft (including prototypes) with respect to physical compatibility with the eligible aircrew population. Provide input as requested for use in trade-off studies with respect to anthropometric accommodation. Where it is determined that new aircraft will be incompatible with a proportion of the eligible aircrew population, AIR-531 will ensure NAVAIRTESTCEN and/or other Navy activities participating in flight test of the new aircraft) is advised of the anthropometric restrictions placed on the aircraft.

(c) investigate new items of aircrew flight clothing and equipment, life support systems, escape systems (e.g., ejection seats), and other aircrew mounted systems undergoing development (including prototypes), proposed aircrew system changes, rapid action changes or other proposed changes to existing aircrew physical accommodation in crew stations. If it is determined that a new item of aircrew flight clothing, equipment, etc. will impact aircrew accommodation, AIR-531 will provide direction and resources to NAVAIRTESTCEN to assess the magnitude of the impact in each affected aircraft model and provide results to AIR-531 prior to CCB action;

(d) monitor all existing inventory aircraft, investigate suspected or reported aircrew accommodation problems and notify AIR-511, APC200, or Logistic Management Division (AIR-410), when it is determined that aircraft anthropometric restrictions need revision;

(e) prepare form NAVAIR 3930/1, AIRTASK/Work Unit Assignment for NAVAIRTESTCEN to obtain new crew station measurements and develop restrictions as required;

(f) revise and update enclosures (1) and (2) as required and issue changes on a timely basis;

(g) forward revisions or updates of enclosures (1) and (2) to the appropriate agencies specified on the distribution list; and

(h) coordinate Anthropometric Restriction Code (ARC) issues and updates with appropriate agencies and other commands.

b. NAVAIRTESTCEN will

(1) determine resources required to measure aircraft crew stations and analyze and develop anthropometric restrictions and procedures; and

(2) comply with requirements of AIRTASK/Work Unit Assignments for aircraft crew station measurements and necessary restrictions. Provide results to NAVAIRHQ, AIR-531, and cognizant program office per assigned schedules.

c. WSM's will support paragraph 7a(1) responsibilities and advise AIR-531, with a copy to APC200 and AIR-410 of any ECP's, RAMEC's or other proposed changes suspected or predicted to impact crew station geometry or aircrew physical accommodation in aircraft under their cognizance. Notification will be accomplished prior to forwarding the associated CCB form NAVAIR 13050/2, CCB Change Request/Directive for processing. Form NAVAIR 13050/2 change request will include justification for any degradation in crew physical accommodation.

8. Forms

a. NAVAIR Field Activities. NAVAIR 13050/2, CCB Change Request, is available from NAVAIRHQ (APC200).

b. NAVAIRHQ. NAVAIR 3930/1, AIRTASK/Work Unit Assignment, and NAVAIR 13050/2 are available in NAVAIRHQ Forms Stock Room.

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PERSONAL ANTHROPOMETRIC CODES

(1) SITTING HEIGHT		(2) FUNCTIONAL REACH		(3) BUTTOCK KNEE LENGTH		(4) LEG LENGTH	
Internal		Internal		Internal		Internal	
Code	Inches	Code	Inches	Code	Inches	Code	Inches
9	40.0-41.0	9	$\leq$ 27.9	9	$>$ 28.0	9	49.0-50.0
8	39.5-39.9	8	28.0-28.4	8	27.0-28.0	8	48.0-48.9
7	39.0-39.4	7	28.5-28.9	7	26.5-26.9	7	47.0-47.9
6	38.5-38.9	6	29.0-29.4	6	26.0-26.4	6	46.0-46.9
5	38.0-38.4	5	29.5-30.4	5	25.5-25.9	5	45.0-45.9
4	35.0-37.9	4	30.5-30.9	4	25.0-25.4	4	43.0-44.9
3	34.0-34.9	3	31.0-31.4	3	24.0-24.9	3	40.0-42.9
2	33.0-33.9	2	31.5-32.4	2	23.0-23.9	2	39.0-39.9
1	32.5-32.9	1	32.5-33.9	1	22.0-22.9	1	38.0-38.9
0	32.0-32.4	0	$\geq$ 34.0	0	$\leq$ 21.9	0	36.0-37.9

AIRCRAFT ANTHROPOMETRIC RESTRICTIONS

This chart presents United States Navy and United States Marine Corps aircraft and indicates, by the presence of anthropometric code values, aircraft where evidence of incompatibility has been demonstrated or a fit check is required. Values not in parenthesis indicate that an individual with these values should not be assigned to that aircraft. Values in parenthesis indicate that a fit check is required. Fit checks are to be performed by Aeromedical Safety Officers and squadron Naval Air Training and Operating Procedures Standardization (NATOPS)/safety officers. Results are to be documented in health record and individual's NATOPS training jacket (with copy to Pacific Missile Test Center (Code 1021)). This chart is to be used in the assignment of personnel to aircraft. Code values of each anthropometric dimension, where there exists a restriction in some aircraft, are summarized at the top of the chart. Unless otherwise listed, restrictions apply only to flight station assignments. In most multi-crew aircraft (e.g., P-3, E-2), no restrictions have been established for aft cabin crewstation occupants (e.g., enlisted aircrew).

AIRCRAFT	SITTING HEIGHT 0 1 2	FUNCTIONAL REACH	BUTTOCK KNEE	LEG LENGTH
T-34C				
Pilot	(0 1 2 9)	(8 9)	(0 8 9)	(0 8 9)
NFO	(9)		(8 9)	(8 9)
T-2C				
Pilot	0 1 2 (8 9)	(7 8 9)	(0 8 9)	(0 1 8 9)
NFO	(8 9)	(8 9)	(0 1 9)	(8 9)
T-44	0 1 2 (3)	(8 9)	(0 1 7 8 9)	(0 1 2 7 8 9)
TH-57	(8 9)	(7 8 9)	(8 9)	(0 1 8 9)
TA-4J (F, R) A-4E/F/M OA-4M				
Pilot	0 1 2 (8 9)	(7 8 9)	(0 7 8 9)	(0 1 7 8 9)
NFO	(8 9)	(8 9)	(0 7 8 9)	(7 8 9)
A-6E,KA-6D, EA-6A, EA-6B				
Pilot	0 1 2 (8 9)	(7 8 9)	(7 8 9)	(0 1 8 9)
NFO/ECMO	(0 1 2 8 9)	(7 8 9)	(7 8 9)	(8 9)

AIRCRAFT	SITTING HEIGHT 0 1 2	FUNCTIONAL REACH	BUTTOCK KNEE	LEG LENGTH
A-7E/TA-7C	0 1 2 (8 9)	(7 8 9)	(7 8 9)	(0 1 7 8 9)
AV-8A, TAV-8A AV-8B	0 1 2 (8 9)	(7 8 9)	(7 8 9)	(0 1 7 8 9)
C-130	0 1 2	(6 7 8 9)	(9)	(0 1 8 9)
C-131	(0 1 2)	(7 8 9)		(0 1 8 9)
E-2/C-2	0 1 2 (9)	(7 8 9)	(8 9)	(0 1 8 9)
A-3/EA-3	(0 1 2)	(7 8 9)	(8 9)	(0 1 8 9)
OV-10 (F, R)	(0 1 2 8 9)	(7 8 9)	(8 9)	(0 1 8 9)
RF-8	0 1 2 (8 9)	(7 8 9)	(8 9)	(0 1 8 9)
F-4N/J/S Pilot NFO	0 1 2 (8 9) (8 9)	(7 8 9) (7 8 9)	(8 9) (8 9)	(0 1 8 9) (8 9)
F-14A Pilot NFO	0 1 2 (8 9) (8 9)	(7 8 9) (7 8 9)	(7 8 9) (7 8 9)	(0 1 7 8 9) (7 8 9)
F-18A, TF-18	0 1 2 (8 9)	(7 8 9)	(7 8 9)	(7 8 9)
UH-1 Series	0 1	(8 9)	(8 9)	(0 8 9)
H-2 Series	0 1 2	(7 8 9)	(0 9)	(0 9)

AIRCRAFT	SITTING HEIGHT 0 1 2	FUNCTIONAL REACH	BUTTOCK KNEE	LEG LENGTH
H-3 Series	0 1 2	(7 8 9)	(0 9)	(0 9)
H-46	0 1	(7 8 9)	(0 9)	(0 9)
H-53 Series	0 1 2	(7 8 9)	(0 9)	(0 1 9)
P-3A/B/C	0 1	(7 8 9)	(8 9)	(0 1 9)
S-3A PILOT NFO	0 1 (8 9) (8 9)	(7 8 9) (7 8 9)	(0 7 8 9) (0 7 8 9)	(0 1 7 8 9) (7 8 9)
C-12	0 1 2	(7 8 9)	(0 1 7 8 9)	(0 1 7 8 9)

The following aircraft have not been measured for anthropometric restrictions as of the date of issue of this revision. Applicable PM's are responsible for their measurement and the establishment of related ARC's, if any. Upon completion of all aircrew station measurements, associated ARC's will be distributed via update of this document.

E-6A
T-45
T-47
T-38/F-5
SH-60 Series
AH-1 Series
OV-1
RF-4
F-86
F-16N
F-21
US-3
V-22
Airship
Martime Patrol Aircraft
Land Based Tanker
ERCX

Notes: 1. (F) = Front (R) = Rear

CAUTION: The absence of any code value for an aircraft does not assure that personnel with values of 0 or 9 will be compatible with that aircraft. Special attention must be given to these personnel on a case-by-case basis, taking into account the dynamic interrelationship of the individual dimensions.